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“Knowledge is such a treasure which cannot be stolen”



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*Indian Standard*  
SPECIFICATION FOR  
SMITH'S FULLERS  
( *First Revision* )

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INDIAN STANDARDS INSTITUTION  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

# Indian Standard

## SPECIFICATION FOR SMITH'S FULLERS

### ( First Revision )

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*Indian Standard*  
**SPECIFICATION FOR  
SMITH'S FULLERS  
(First Revision)**

**0. FOREWORD**

**0.1** This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 11 January 1968, after the draft finalized by the Hand Tools Sectional Committee had been approved by the Mechanical Engineering Division Council.

**0.2** This standard was originally issued in 1956. The present revision of the standard has been taken up to express the dimensional and other requirements only in metric units, rationalized to the extent practicable.

**0.2.1** Advantage of this revision has been taken to reduce the number of sizes in case of smith's bottom fullers, small shank, and smith's top fullers, handle type from eight to seven.

**0.3** This standard specifies the requirements of the following two forms of the smith's fullers:

- a) Bottom, tool form; and
- b) Top, tool form.

Both these forms are used independently or in conjunction with each other for the grooving and spreading hot iron.

**0.4** It is recommended that the purchaser should clearly specify in the enquiry and order the requirements by reference to the type and size in this standard.

**0.5** While preparing this standard assistance has been derived from specification No. IND/GS/435 'Fullers, bottom and top' issued by Ministry of Defence, Government of India.

**0.6** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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\*Rules for rounding off numerical values (*revised*).

## **1. SCOPE**

**1.1** This standard covers the requirements for the following types of smith's fullers:

- a) Smith's bottom fullers, small shank;
- b) Smith's bottom fullers, large shank;
- c) Smith's top fullers, handle type; and
- d) Smith's top fullers, wire clamp type.

## **2. MATERIAL**

**2.1** The fullers shall be manufactured from steel conforming to T60 of Schedule VI of IS : 1570-1961\* with a maximum phosphorus and sulphur content of 0.050 percent each.

**2.2** Clamps for smith's top fullers, wire clamp type shall be made from steel conforming to IS : 280-1962†.

## **3. HARDNESS**

**3.1** Working faces of fullers shall have a hardness of 450 to 550 *HV* ( see IS : 1501-1959‡ ) or its equivalent in other scales.

**3.1.1** For the determination of hardness, any recognized form of hardness tester may be used.

## **4. SHAPES AND DIMENSIONS**

**4.1** The general shape and dimensions of bottom fullers, small shank and large shank and top fullers, handle type shall be as given in Tables 1, 2 and 3 respectively.

**4.2** The general shape and dimensions of top fullers, wire clamp type shall be as shown in Fig. 1.

**4.3** Fullers with slightly different dimensions may be accepted subject to prior agreement between the purchaser and the supplier.

## **5. TOLERANCES**

**5.1** Permissible tolerances on dimensions shall be as indicated in the relevant tables. Tolerances on other dimensions shall be in accordance with IS : 3469-1966§ and shall not exceed  $\pm 1$  mm.

\*Schedules for wrought steels for general engineering purposes.

†Specification for mild steel wire for general engineering purposes ( revised ).

‡Method for Vickers hardness test for steel.

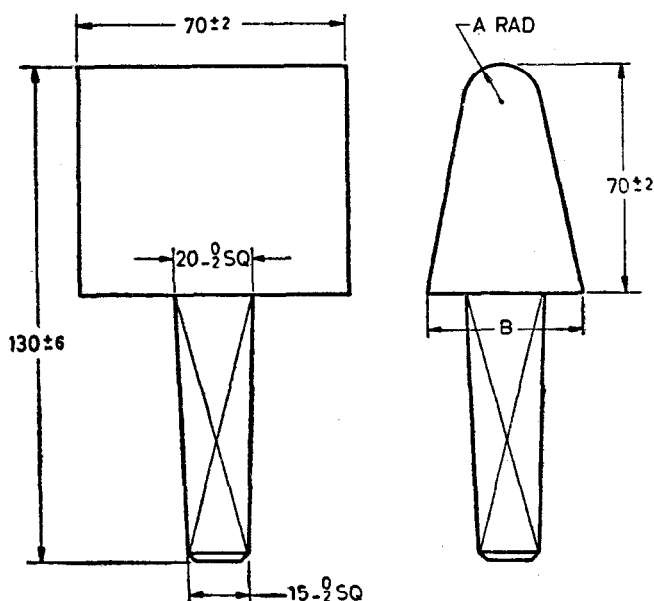
§Tolerances for steel drop forgings, upset forgings, press forgings and forged bars.



**TABLE 1 DIMENSIONS FOR SMITH'S BOTTOM FULLERS,  
SMALL SHANK**

( Clause 4.1 )

All dimensions in millimetres.

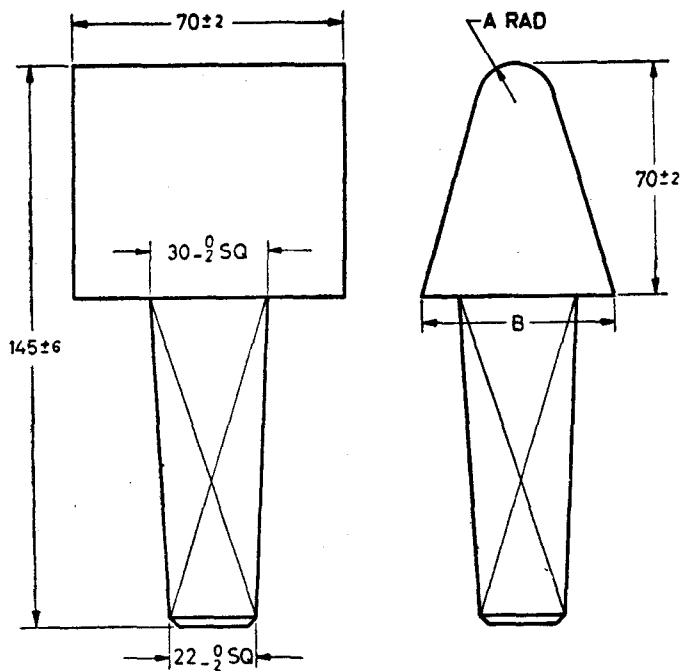


NOMINAL SIZE	RADIUS A $\pm 0.4$	WIDTH B $\pm 2$
6	3.0	35
10	5.0	35
12	6.0	40
16	8.0	40
20	10.0	40
25	12.5	45
32	16.0	50

TABLE 2 DIMENSIONS FOR SMITH'S BOTTOM FULLERS,  
LARGE SHANK

( Clause 4.1 )

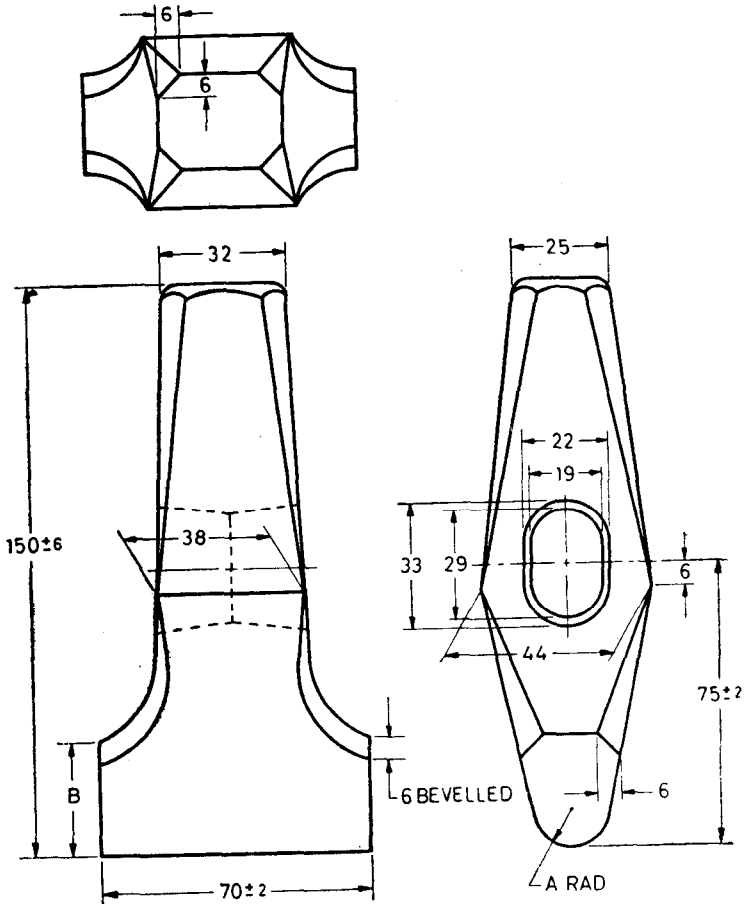
All dimensions in millimetres.



NOMINAL SIZE	RADIUS <i>A</i> $+0.4$ $-0$	WIDTH <i>B</i> $\pm 2$
10	5.0	45
12	6.0	45
20	10.0	50
25	12.5	55

**TABLE 3 DIMENSIONS FOR SMITHS'S TOP FULLERS, HANDLE TYPE**  
(Clause 4.1)

All dimensions in millimetres.



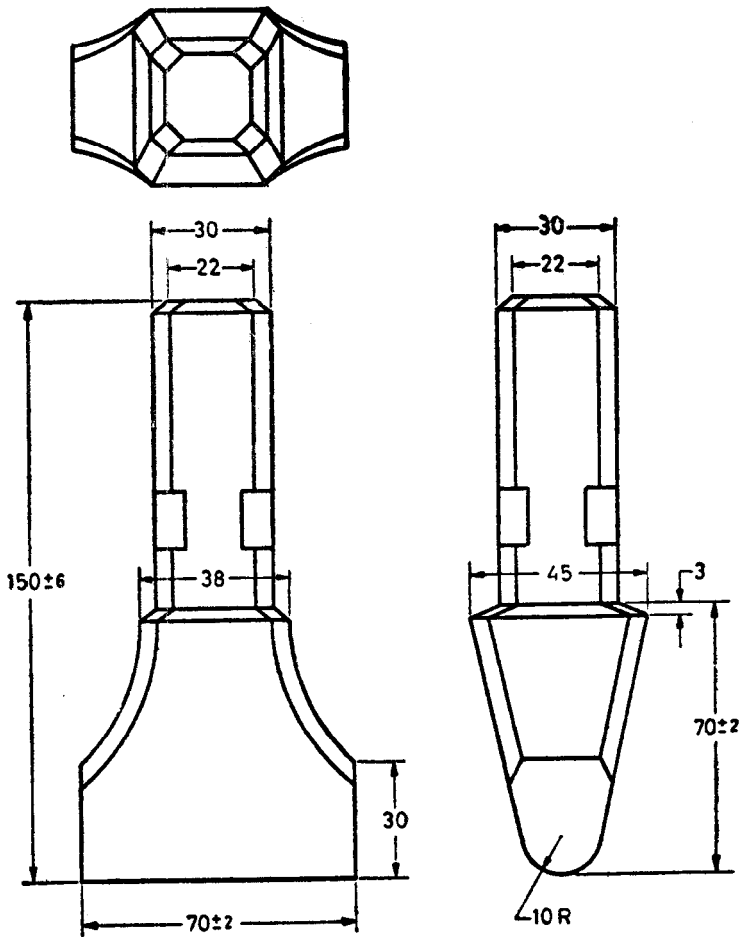
NOMINAL  
SIZE

RADIUS *A*

SHOULDER *B*  
±2

	+0.4 -0
6	3.0
10	5.0
12	6.0
16	8.0
20	10.0
25	12.5
32	16.0

20
25
25
30
30
30
35



All dimensions in millimetres.

FIG. 1 DIMENSIONS FOR SMITH'S FULLER, TOP, WIRE CLAMP TYPE

## 6. HANDLES

**6.1** When the handles are required to be supplied with the smith's fullers, handle type they shall conform to requirements of those of class 3 of IS : 620-1965\* They shall be shaped before fitting to suit the eyes of fullers.

## 7. MANUFACTURE

**7.1** Fullers shall be soundly forged to the shape and design in one piece. The eye in top fullers, handle type, shall be central and oval and shall be drifted from both sides to leave a central waist.

**7.2** The shank of bottom fullers, small shank and large shank, shall be accurately formed and shall taper towards the end. The working faces shall be accurately rounded to the required radius. They shall be well and evenly hardened and tempered.

**7.3** The sides of top fullers, wire clamp type shall be properly grooved to hold the clamp in proper position.

## 8. WORKMANSHIP AND FINISH

**8.1** Fullers shall be free from cracks, seams, pits, scales, flaws, burrs and other defects. They shall be finished smooth all over with the working faces finished bright.

**8.2** The eye for the handle in case of top fullers, handle type, shall be free from sharp edges.

## 9. DESIGNATION

**9.1** The fullers shall be designated by:

- a) commonly used name,
- b) nominal size, and
- c) number of this standard.

### *Example*

A smith's bottom fullers, small shank having a nominal size of 6 mm shall be designated as:

Smith's Bottom Fullers, Small Shank, 6 IS : 847

## 10. PRESERVATIVE TREATMENT

**10.1** The working face of each fuller shall be coated with a suitable anti-corrosive paint when required by the purchaser.

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\*General requirements for wooden tool handles ( second revision ).

## **11. SUPPLY OF SMITH'S FULLERS**

**11.1** General requirements relating to the supply of smith's fullers shall conform to IS : 1387-1959\*.

## **12. MARKING**

**12.1** Fullers shall be clearly and legibly marked with the manufacturer's name or initials and/or recognized trade-mark, and size. When required by the purchaser the year of manufacture shall also be marked.

**12.1.1** The fullers may also be marked with the ISI Certification Mark.

**NOTE** — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution ( Certification Marks ) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

## **13. PACKING**

**13.1** Fullers shall be packed in suitable packing cases of a size convenient for handling in transit and as specified by the purchaser. Each type and size of fuller shall be kept separate when packed.

## **14. SAMPLING**

**14.1** Unless otherwise agreed to between the supplier and the purchaser, the sampling plan as given in Appendix A shall be followed.

## **15. MECHANICAL TESTS**

**15.1** Top fullers shall be placed on an anvil with its working face downward and with a mild steel plate 6 mm thick interposed between the anvil and the face. Three full blows shall be struck on the shank end with a 2.5-kg sledge hammer. The fuller shall not show any sign of damage or distortion after the test.

**15.2** Bottom fullers shall be held in the cutter hole of the anvil in such a manner that it sits snugly in the hole. A mild steel plate 6 mm thick shall be placed on the top of this face and three full blows shall be struck on it with a 2.5-kg sledge hammer. The fuller shall not show any sign of damage or distortion after the test.

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\*General requirements for the supply of metals and metal products.

## APPENDIX A

( Clause 14.1 )

## SCALE OF SAMPLING AND CRITERIA FOR CONFORMITY

## A-1. SCALE OF SAMPLING

**A-1.1 Lot** — In any consignment all the smith's fullers of the same type and size manufactured under essentially similar conditions of manufacture shall constitute a lot.

**A-1.2** For ascertaining the conformity of the lot to the requirements of this specification, tests shall be carried out for each lot separately. The number of smith's fullers to be selected at random for this purpose shall be in accordance with col 1 and 2 of Table 4.

TABLE 4 SAMPLE SIZE AND CRITERIA FOR CONFORMITY

( Clauses A-1.2, A-1.3, A-2.1.1 and A-2.2 )

LOT SIZE	FOR HARDNESS, SHAPES AND DIMENSIONS, TOLERANCES, WORKMANSHIP AND FINISH		FOR MECHANICAL TEST
	Sample	Size	SUB-SAMPLE SIZE
$N$	Permissible No. of Defectives		
(1)	(2)	(3)	(4)
Up to 25	3	0	2
26 „ 50	5	0	2
51 „ 100	8	0	3
101 „ 150	13	1	4
151 „ 300	20	1	5
301 and above	32	2	8

**A-1.3** The fullers shall be selected at random and to ensure the randomness of selection, random number tables shall be used. If the tables are not available the following procedure is recommended for use:

Starting from any fuller in a lot, count them in one order as 1, 2, 3,....., up to  $r$  and so on where  $r$  is the integral part of  $N/n$  ( $N$  being the lot size and  $n$  the sample size indicated in col 2 of Table 4). Every  $r$ th smith's fuller thus counted shall be selected to constitute the sample.

## **A-2. NUMBER OF TESTS AND CRITERIA AND CONFORMITY**

**A-2.1** The smith's fullers selected according to **A-1.3** shall be examined for hardness, shapes and dimensions, tolerances, and workmanship and finish as specified in **3, 4, 5** and **8** respectively. Any fuller failing to meet the requirements of any one or more of the characteristics shall be considered defective.

**A-2.1.1** If the number of defective fullers in the sample is less than or equal to the corresponding permissible number of defectives given in col 3 of Table 4, the lot shall be declared conforming to the characteristics mentioned in **A-2.1**.

**A-2.2** From lots found satisfactory in accordance with **A-2.1.1**, a sub-sample of the size indicated in col 4 of Table 4 shall be selected and subjected to mechanical tests (*see 15*).

**A-2.2.1** If all the fullers subjected to mechanical tests satisfy the necessary requirements, the lot shall be declared conforming to the requirements of this standard; otherwise not.